

CEAS International Forum
on Aeroelasticity and
Structural Dynamics
1997

Informal Conference Proceedings

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Short Summary

Introduction

The Confederation of European Aerospace Societies (*CEAS*) comprises the Association Aéronautique et Astronautique de France (AAAF), the Asociación de Ingenieros Aeronáuticos de España (AIAE), the Associazione Italiana di Aeronautica e Astronautica (AIDAA), the Deutsche Gesellschaft für Luft- und Raumfahrt (DGLR), the Nederlandse Vereniging voor Luchtvaarttechniek (NVvL), and the Royal Aeronautical Society (RAeS). The *CEAS* International Forum on Aeroelasticity and Structural Dynamics 1997 has been held at the College of Engineering of the University of Rome "La Sapienza" on 17-20 June 1997. The Forum has been intended to give a comprehensive survey of the current status of research and development work in these fields for both aircraft and spacecraft. In addition to the formal delivery of papers, an important objective of this Forum is to provide an opportunity for informal exchanges of opinions and experience between participants.

Participants

The total number of participants is **152**, from 19 different countries. In particular, they came from:

Country	Number
Italy	53
Germany	22
USA	22
UK	16
France	12
Japan	5
Israel	3
The Netherland	3
Russia	2
Singapore	2
South Africa	2
Spain	2
Sweden	2
Austria	1
Belgium	1
Brazil	1
India	1
Poland	1
Turkey	1

The complete list of participants is given in the Appendix.

Main Trust

As clear from the title the main trust of the Forum was: Aeroelasticity and Structural Dynamics. In particular, the Forum included the following topics:

1. **Unsteady Aerodynamics and Aeroelastic Characteristics of Aerospace Structures** – Dynamic Stall, Buffeting, Buzz, Flutter Prediction Methods, Aeroelasticity in Separated Flow, Propeller Blade Aeroelasticity, Prediction of Unsteady Aerodynamic Forces Based on Experimental and Theoretical Methods, Flight Vibration and Flutter Testing Techniques, Measurement and Correction of Flexible Wind-Tunnel Models, Laminar Flow Control, Aeroelasticity Design and Qualification.
2. **Structural Modelling and Optimisation** – Analytical Modelling with Emphasis on Advanced Strategies and Reliability, Safety and Impact, Continuous Concepts

(Impedance Matrix Approach), Dynamic Substructuring and Condensation, Optimisation of Structures with special regard to Static and Dynamic Aeroelasticity and Structural Dynamic Constraints, Aeroelastic Tailoring, Structural Coupling with Internal Fluids including Acoustics and Statistical Approach, Wave Propagation and Scattering in Solids, Physical and Geometric Nonlinearities (including Thermoelastic Effects), Aspects of Multidisciplinary Design and Analytical Process Chains.

3. **Active Control and Smart Structures** – Self-sensing and Actuation, Static and Dynamic Aeroelastic Control, Active Vibration and Noise Control, Sensor/Actuator Embedding and Interrogation, Intrusion Effects, Developments in New Materials, Current Limitations of Smart Materials, Active Damping Concepts, Fault Location and Control, Optimisation of Sensor Type and Location, Flutter Suppression and Flutter Margin Augmentation emphasising Robustness and Reliability, Loads and Gust Alleviation.
4. **Certification and Qualification** – Testing for Certification, Full-scale and Small-scale Testing, Ground and Flight Testing, Replacement of Testing by Computer Simulation, Adaptation of Regulations and Requirements to Fly-by-wire Concepts, Means of Compliance, Qualification of Equipment and Payloads.
5. **Testing for Validation** – All topics related to Vibration Testing for the purpose of validating Theoretical Models of Structural Dynamics. Testing Aspects: Measurement Techniques, Modal Testing and Analysis, System Identification, Ground Vibration Testing Procedures, Special Requirements for Nonlinear Structures. Validation Procedures for Comparison and Correlation of Test and Analysis Models, Localisation of Differences between Models and Updating to Reconcile Models from both sources.

Comments

Many of the attendees volunteered comments to the effect that the Forum was very successful in that: (1) the scientific content was excellent (2) the organization was very good. No negative comments were received.

Also, everyone apparently enjoyed the social activity (visits at the Museo Capitolino and at the Museo Etrusco, banquet at the Palazzo Brancaccio). Also, positive reactions were received regarding the integration of social activities with the scientific program (e.g., visit at the Museo Capitolino before the Lecture of Prof. Paolo Santini and the Concert during the reception after the Lecture of Dr. Irving Abel of the NASA Langley Research Center).

Finally, one positive aspect that ought to be mentioned is that the Proceedings were available at the beginning of the Forum; furthermore, all the papers that were received were included in the Proceedings; specifically, only one paper (out of 113) was not included in the Proceedings. This accomplishment was achieved in spite of the fact that some of the papers were received three days before the beginning of the Forum: we wish to acknowledge the contribution of the printer *Esagrafica* in this regard.

The Future

The CEAS Specialists' Committee on Structures and Materials decided that the Forum will be held again in 1999, in Williamsburg, Virginia. Dr. Irving Abel, of NASA Langley Research Center (Hampton, VA) will be in charge of the organization.

Appendix: List of participants

Dr. Abel I.	Structure Division NASA Langley Research Center	+1 757 864 2934 i.abel@larc.nasa.gov
Dr. Abrahamsson T.	Saab Military Aircraft	+46 13 785429 thomas.abrahamsson@saab.se
Ing. Adamo L.	Department of Mechanics and Aeronautics University of Rome 'La Sapienza'	+39 6 4458 5556 luca@sestieri.ing.uniroma1.it
Prof. Agneni A.	Department of Aerospace Engineering University of Rome 'La Sapienza'	
Dr. Ing. Albus J.	Institut für Leichtbau RWTH Aachen University of Technology	+49 241 80 6831 albus@ifl.RWTH-Aachen.De
Dr. Anderson J.	Department of Aerospace Engineering Department of Aerospace Engineering	+44 141 330 4344 j.anderson@aero.gla.ac.uk
Mrs. Ariano M.R.	Department of Aeronautical Engineering University of Naples 'Federico II'	
Ing. Attanasio G.	Department of Aerospace Engineering Politecnico di Milano	+39 2 2399 4053 attanasio@betanet.it
Prof. Balis Crema	Department of Aerospace Engineering University of Rome 'La Sapienza'	+39 6 4458 5800
Prof. Ballmann J.	RWTH Aachen, University of Technology	+49 241 888 8126 ballmann@lufmech.RWTH-Aachen.De
Prof. Barboni R.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+39 6 4458 5937
Ing. Battipede M.	Department of Aeronautical and Aerospace Engineering Politecnico di Torino	+39 11 564 4854 gili@polito.it
Dr. Battoo R.	Cranfield College of Aeronautics Cranfield University	+44 1234 75 4779 R.S.Battoo@cranfield.ac.uk
Dr. Becker	Daimler-Benz Aerospace AG Military Aircraft Division LMT2	+49 89 607 24702 be24702@dbmail.dasa.de
Prof. Becus G.A.	AsE/EM Dept. University of Cincinnati	+1 513 556 3222 gbecus@uceng.uc.edu
Prof. Bendiksen O.	Department of Mechanical and Aerospace Engineering University of California	+1 310 206 5453 oddvar@seas.ucla.edu
Ing. Bernardini G.	Department of Aerospace Engineering Università degli Studi di Pisa	+39 50 550200 berno@seine.dma.uniroma3.it
Prof. Breitbach E.	Institut für Aeroelastik DLR	+49 531 295 2300
Mr. Britt R.T.	Northrop Grumman Military Aircraft Systems Division	+1 562 942 5164 TERRYBRITT@aol.com
Dipl.Ing. Britten G.	Lehr-und Forschungsgebiet für Mechanik RWTH Aachen, University of Technology	+49 241 80 4636 gerd@lufmech.RWTH-Aachen.De
Dr. Butler R.	School of Mechanical Engineer University of Bath	+44 1225 826286 R.Butler@bath.ac.uk
Mr. Caldwell B.	British Aerospace Defence Ltd Military Aircraft Division	+44 1772 63 3333
Dr. Calvi A.	Alenia Aerospazio	+39 11 7180221 acalvi@to.alespazio.it
Dr. Carrera E.	Department of Aeronautical and Aerospace Engineering Politecnico di Torino	+39 11 564 6836 carrera@polito.it
Dr. Chan Y.W.	Defence Science Organization	+65 6607449
Dr. Chen	ZONA Technology, Inc.	+1 602 831 2775 aer0501@vmsa.technion.ac.il
Prof. Chiocchia G.	Department of Aeronautical and Aerospace Engineering Politecnico di Torino	+39 11 546 6845 chiocchia@polito.it
Mr. Cinquina G.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+39 6 4458 5335 cinquina@thames.dma.uniroma3.it
Dr. Climent H.		+34 1 624 2393
Dr. Cooper J.E.	School of Engineering University of Manchester	+44 161 275 4337 jecoop@fs1.eng.man.ac.uk
Ing. Coppotelli G.	CIRA	+39 823 62 3508 coppotel@cira.it

Mr. Corbelli A.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+39 6 4458 5335 corbelli@seine.dma.uniroma3.it
Mrs. Corsetti E.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+39 6 4458 5335 corsetti@seine.dma.uniroma3.it
Dr. Cossu	Laboratoire d'Hydrodynamique Ecole Polytechnique	+33 1 6933 3679 carlo@ladhyx.polytechnique.fr
Prof. Crighton D.E.	DAMTP University of Cambridge	+44 1223 337860 dgc@damtp.cam.ac.uk
Dr. Degener M.	DLR Institute of Aeroelasticity	+49 551 709 2349 Manfred.Degener@dlr.de
Mr. De Luca S.	Department of Aeronautical Engineering University of Naples 'Federico II'	+39 81 560 4122
Dr. Denegri M.	Air Force SEEK EAGLE Office	+1 904 882 3017 denegri@eglin.af.mil
Dr. De Rosa S.	Department of Aeronautical Engineering University of Naples 'Federico II'	+39 81 768 3319 derosa@unina.it
Ing. Dessi D.	Aerospace Department University of Rome 'La Sapienza'	+39 6 4458 5335 daniele@morino.ing.uniroma1.it
Dr. De Troia R.	Department of Mechanical and Industrial Engineering University of Rome III	+39 6 5517 5018 lello@thames.dimi.uniroma3.it
Mr. Dimitriadis G.	School of Engineering University of Manchester	+44 161 224 1228 dimitrig@ma.man.ac.uk
Mr. Dolfi T.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+39 6 4458 5335 dolfi@andromeda.dma.uniroma3.it
Prof. Dowell E.	School of Engineering Duke University	+1 919 660 5389
Prof. Dzygadło Z.	Institute of Aviation Technology Military University of Technology	
Prof. Eisenberger M.	Technion, Israel Institute of Technology Dept. of Civil Engineering	+972 4 8293043 eizen@tx.technion.ac.il
Mr. Esquerre J.P.	Aeroelastic and Loads Department Aerospatial Aeronautique	+33 561 938464 jean-paul-esquerre@avions.aerospatiale.fr
Ing. Eussen B.J.G.	NLR	+31 20 511 3461 eussen@nlr.nl
Dr. Fath	AEROSPATIALE	+33 5 61937657
Prof. Frediani A.	Department of Aerospace Engineering Universita' di Pisa	+39 50 55 0200 caprice@p-server.aero.cci.unipi.it
Prof. Friedmann P.P.	Mechanical and Aerospace Engineering Dept. University of California	+1 310 825 6041 friedman@seas.ucla.edu
Ing. Garrigues E.	Dassault Aviation	
Dr. Gasbarri P.	Department of Aerospace Engineering University of Rome 'La Sapienza'	gasbarri@santini.ing.uniroma1.it
Dr. Gattulli V.	Dipartimento di Ing. delle Strutture, delle Acque University of L'Aquila	+39 862 43 2716 gattulli@scilla.ing.uniroma1.it
Dr. Gaudenzi P.	Department of Aerospace Engineering University of Rome 'La Sapienza'	paolo@gaudenzi.ing.uniroma1.it
Dr. Gennaretti M.	Department of Mechanical and Industrial Engineering University of Rome III	+39 6 5517 5018 massimo@seine.dimi.uniroma3.it
Dr. Ghiringhelli G.L.	Department of Aerospace Engineering Politecnico di Milano	+39 2 2399 4034 ghiring@convex.cilea.it
Prof. Gili P.	Department of Aeronautical and Aerospace Engineering Politecnico di Torino	+39 11 564 6899 gili@polito.it
Dipl.Phys. Gloth G.	Institute of Mechanics University of Kassel	+49 561 804 2831 gloth@ifm.maschinenbau.uni-kassel.de
Dipl.Ing. Grabietz M.		+49 0 2572 47585 michael.grabietz-ing@t-online.de
Dr. Griffin D.	Alenia Aerospazio	+39 6 4151 2569 d.griffin@roma.alespazio.it
Dr. Guilmineau E.	Ecole Centrale de Nantes Laboratoire de Mécanique des Fluides	+33 2 4037 1681 Emmanuel.Guilmineau@ec-nantes.fr
Prof. Harris W.L.	Massachusetts Institute of Technology	+1 617 253 0911 weslhar@mit.edu
Ing. Hermans L.	LMS International	+32 1 6384200 lh@lms.be

Dr. Heuer R.	Civil Engineering Department Technical University of Vienna	+43 1 58801 5536 rh@allmech9.tuwien.ac.at
Dr. Holmes J.	Structural Computing British Aerospace Defence (MAD) Ltd.	+44 01482 66 3826
Dr. Ing. Hönlinger H.	DLR	+49 5 52 7091 Heinz.Hoenlinger@dlr.de
Dipl.Ing. Hornung E.	DASA-RI	+49421 538 4382 einst.hornung@ri.dasa.de
Ing. Humbert M.	AEROSPATIALE	+33 5 6118 1528 marc.humbert@avions.aerospatiale.fr
Dr. Hutin P.M.	Experimental Aeroelasticity Dept. ONERA	+33 1 4673 4600 hutin@onera.fr
Dr. Iemma U.	Department of Mechanical and Industrial Eng. University of Rome III	+39 6 5517 5018 umberto@andromeda.dimi.uniroma3.it
Prof. Isogai K.	Department of Aeronautics and Astronautics Kyushu University	+81 92 642 3725 isogai@aero.kyushu-u.ac.jp
Mr. Jacobsen S.B.	Northrop Grumman Military Aircraft	+1 562 948 9349
Mr. Jamison K.	Aeroteck CSIR	+27 12 841 4249 kjamison@csir.co.za
Mr. Jimenez P.	Aerospatiale Aeronautique Aerodynamics department	+33 561 98 3781 PHILIPPE.JIMENEZ@avions.aerospatiale.fr
Mr. Johan Z.	Centric Engineering Systems	+33 1 4673 4608 zdenek@centric.com
Dr. Karkle P.	Central AeroHydrodynamic Institute	+7 095 556 4072
Prof. Karpel M.	Faculty of Aerospace Engineering Israel Institute of Technology	+972 4 829 3490 aer0501@vmsa.technion.ac.il
Dr. Kelm R.	Daimler-Benz Aerospace AIRBUS Dept. EZB (Future Projects Office)	+49 40 7437 7804 roland.kelm@airbus.dasa.de
Dr. Keye S.	Structural Dynamics Section Inst. of Aeroel. German Aerosp. Reser. Establishm.	+49 551 709 2324 Stefen.Keye@dlr.de
Dr. Knipfer A.	DLR Institute of Aeroelasticity DLR Gottingen	knipfer@biber.ae.go.dlr.de
Dr. Kouzmina S.	Central Aero-Hydrodynamic Institute (TsAGI)	+7 095 556 4072
Mr. Kuran B.	Tubitak-Sage	+90 312 399 0338
Ing. Kutteneuler J.	Royal Institute of Technology	+46 8 790 6447 jakob@frrg.kth.se
Dr. Lacabanne M.	Aerospatiale	+33 05 6193 6127 michel.lacabanne@avions.aerspatiale.fr
Prof. Lecce L.	Department of Aeronautical Engineering University of Naples 'Federico II'	+39 81 768 3327 100410.3506@compuserve.com
Dr. Lind R.	NASA Dryden Flight Research Center	+1 805 258 3075 lind@xrd.dfrc.nasa.gov
Prof. Link M.	University of Kassel	+49 561 804 2634 link@hrz.uni-kassel.de
Mr. Lisandrin P.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+39 6 4458 5335 lisandro@seine.dma.uniroma3.it
Prof. Liu D.	Arizona State University	+1 602 965 4117 danny.liu@asu.edu
Mr. Loasby	Department of Aeronautics and Astronautics Southampton University	+44 1703 59 3383 pml@soton.ac.uk
Ing. Longhi A.	Department of Aerospace Engineering University of Pisa	+39 50 55 0200 longhi@p-server.aero.cci.unipi.it
Dipl.Ing. Luber W.	Military Aircraft LMT24 Daimler-Benz Aerospace	+49 89 6072 6996 lu26996@dbmail.dasa.de
Prof. Mantegazza P.	Department of Aerospace Engineering Politecnico di Milano	+39 2 2399 4040 mante@ho700.aero.polimi.it
Prof. Marchetti M.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+39 6 4458 5800
Prof. Marco-Gomez V.	University of Madrid	+34 1 336 6367 vmarco@dva.dva.upm.es
Ing. Masarati P.	Department of Aerospace Engineering Politecnico di Milano	+39 2 2399 4053

Dr. Mastroddi F.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+39 6 4458 5945 mastrodd@morino.ing.uniroma1.it
Dr. Matsushita H.	National Aerospace Laboratory	+81 422 47 5911 matsushita@nal.go.jp
Dr. Meyer J.J.	National Aerospace Laboratories (NLR)	+31 20 511 3448 meyer@nlr.nl
Ing. Milazzo A.	Department of Mechanics and Aeronautics	+39 91 42 2748 davi@mbbox.unipa.it
Prof. Milgram J.	M.I.T.	+1 671 753 5943 jmilgram@mit.edu
Prof. Morino L.	Department of Mechanical and Industrial Engineering University of Rome III	+39 6 5517 5019 luigi@thames.dimi.uniroma3.it
Prof. Morris A.J.	University of Cranfield	A.J.Morris@cranfield.ac.uk
Mr. Moses R.W.	NASA Langley Research Center	+1 757 864 7033 r.w.moses@larc.nasa.gov
Dr. Nakamichi J.	Aeroelasticity Branch, Structural Mechanics Division National Aerospace Laboratory	+81 422 47 5911 jiro@nal.go.jp
Prof. Namachchivaya S.	Aeronautical and Astronautical Engineering University of Illinois at Urbana-Champaign	+1 217 244 0683
Dr. Nicot P.	Dassault Aviation	+33 1 4711 4692
Prof. Nissim E.	Faculty of Aerospace Engineering Technion-Israel Institute of Technology	+972 4 829 2264 eli@aenis.technion.ac.il
Dr. Nixon M.W.	NASA Langley Research Center	+1 757 864 2934 m.w.nixon@larc.nasa.gov
Ing. Notarnicola M.	Alenia Spazio Torino	+39 11 7180 221
Dr. Pasca M.	Dip. di Ingegneria Strutturale e Geotecnica University of Rome 'La Sapienza'	+39 6 4458 5156 pasca@pasca.ing.uniroma1.it
Prof. Pazini Brandao M.	Aerospace Technical Center - CTA	+55 12 340 3465 pazini@aer.ita.cta.br
Dr. Pellicano F.	Department of Mechanics and Aeronautics University of Rome 'La Sapienza'	+39 6 4458 5235 frank@sestieri.ing.uniroma1.it
Mr. Petiau R.	Dassault Aviation	
Dr. Pieracci A.	University of Pisa	+39 50 55 0200 pieracci@ing.unipi.it
Mr. Piersol J.R.	UCLA	+1 818 222 4977 piersol@seas.ucla.edu
Dr. Poirion F.	ONERA	+33 1 4673 4609 poirion@onera.fr
Mr. Prananta B.B.	Faculty of Aerospace Engineering Delft University of Technology	+31 15 278 7308 b.b.prananta@lr.tudelft.nl
Ing. Quagliotti F.	ALenia Spazio Torino	+39 11 718 1452
Mr. Raffoul C.	EOARD	CRAFFOUL@EOARD.af.mil
Ing. Ramsey W.	MIT	+1 617 253 2819 ram@wydah.mit.edu
Dr. Reichenbach R.E.	ERO	+44 171 514 4904 rreichenbach@onreun.navy.mil
Dr. Ricci F.	Department of Aeronautical Engineering	+39 81 768 3321 fabricci@unina.it
Ing. Romani A.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+33 6 4458 5880
Ing. Ruotolo R.	Department of Aeronautic and Aerospace Engineering Politecnico di Torino	+39 11 564 6853 ruotolo@hpdias.polito.it
Dr. Saitoh K.	National Aerospace Laboratory, Japan	+81 422 47 5911 ksaitoh@nal.go.jp
Dr. Salvatore F.	Department of Mechanical and Industrial Engineering University of Rome III	+39 6 5517 5019 salvat@thames.dimi.uniroma3.it
Capt. Sanders B.	USAF/AFOSB	+1 707 367 6963 Brian.Sanders@AFOSR.af.mil
Prof. Santini P.	Department of Aerospace Engineering University of Rome 'La Sapienza'	+33 6 4458 5327

Ing. Sauvignet C.	ONERA	+33 1 4673 4606 sauvi@onera.fr
Dr. Sbardella L.	Department of Mechanical Engineering Imperial College	+44 171 594 7074 l.sbardella@ic.ac.uk
Dipl.Ing. Schendlinsky C.	Lightweight Structures and Structural Mechanics Lab. University of Kassel	+49 0 561 804 2320 sched@hrz.uni-kassel.de
Dipl.Ing. Schweiger J.	Daimler Benz Aerospace	+49 89 6072 3124
Prof. Sensburg O.	Daimler Benz Aerospace	+449 89 6072 0933
Dr.Ing. Sinapius M.	DLR Institute of Aeroelasticity	+49 551 709 2492 Michael.Sinapius@dlr.de
Mr. Sinno S.	Department of Aeronautical Engineering University of Naples 'Federico II'	+39 81 768 3632 ssinno@itb.it
Mrs. Slone A.	University of Greenwich	+44 181 331 8729 a.slone@gre.ac.uk
Ing. Soh T.Y.	DSO National Laboratories	+65 660 7149
Dr. Tamayama M.	National Aerospace Laboratory	+81 422 47 5911 masato@nal.go.jp
Dr. Taylor J.	School of Mechanical Engineering University of Bath	+44 1225 82 6826 J.M.Taylor@bath.ac.uk
Mr. Taylor P.	Gulfstream Aerospace Corp.	+1 912 965 7030 ptaylor@gulfaero.com
Mr. Thorby D.	Aerostructures British Aerospace Military Aircraft	+44 1252 38 2261
Ing. Vaccaro V.	Alenia Aerospace	+39 11 718 1029
Dr. Vahadati K.	Mechanical Engineering Department Imperial College	+44 171 594 7078 m.imregun@ic.ac.uk
Mr. Van Zyl L.H.	Aerotek, CSIR	+27 12 841 2715 lvzyl@csir.co.za
Prof. Venkatesan C.	Indian Institute of Technology Dept. of Aerospace Engineering	+91 512-25 7284 cven@iitk.ernet.in
Prof. Vestroni F.	University of Rome	
Ing. Vidoli S.	University of Rome	+39 6 4458 5297 vidoli@scilla.ing.uniroma1.it
Dr. Wegner W.	DLR	+49 551 7092 2359 Wolfgang.Wegner@dlr.de
Dr. Wendt V.	DLR	+49 551 7092 2366 Volker.Wendt@dlr.de
Dr. Woppowa S.	DLR Institute für Strömungsmechanik	+49 551 709 2237 Stefan.Woppowa@dlr.de